11:17:44 OCA PAD INITIATION - PROJECT HEADER INFORMATION 08/25/88

Active

Project #: E-25-M69 Cost share #: E-25-345 Rev #: 0
Center # : Q5461-0A0 Center shr #: E5461-0A0 OCA file #:
Work type : RES
Contract#: 588-1170 Mod #: Document : GRANT
Prime #: Contract entity: GIT

Subprojects ? : N
Main project #:

Project unit: ME Unit code: 02.010.126
Project director(s):
UMEAGUKWU I C ME

Sponsor/division names: AMER SOCIETY OF MECH ENGR /
Sponsor/division codes: 500 / 046

Award period: 880701 to 890630 (performance) 890630 (reports)

Sponsor amount	New this change	Total to date
Contract value	20,000.00	20,000.00
Funded	20,000.00	20,000.00
Cost sharing amount		15,000.00

Does subcontracting plan apply ?: N

Title: ACQUISITION OF LABORATORY IMPROVEMENT EQUIPMENT

PROJECT ADMINISTRATION DATA

OCA contact: Steven K. Watt 894-4820

Sponsor technical contact

(000)000-0000

Sponsor issuing office

KEITH BANKWITZ
(313)271-1500
SOCIETY OF MECHANICAL ENGINEERS
ONE SME DRIVE, P.O. BOX 930
DEARBORN, MI 48121

Security class (U,C,S,TS) : U ONR resident rep. is ACO (Y/N): N
Defense priority rating : N/A N/A supplemental sheet
Equipment title vests with: Sponsor GIT X
LASER, ACOUSTO-OPTIC CELL, MICROPROCESSOR CHIPS.

Administrative comments -
PROJECT INITIATION

GEORGIA INSTITUTE OF TECHNOLOGY
OFFICE OF CONTRACT ADMINISTRATION

NOTICE OF PROJECT CLOSEOUT

MC, 5T29

Closeout Notice Date 12/01/89
Original Closeout Started ********

Project No. E-25-M69 Center No. Q5461-0A0

Project Director UMEAGUKWU I C School/Lab ME

Sponsor AMER SOCIETY OF MECH ENGR/

Contract/Grant No. 588-1170 Contract Entity GIT

Prime Contract No.

Title ACQUISITION OF LABORATORY IMPROVEMENT EQUIPMENT

Effective Completion Date 891019 (Performance) 891019 (Reports)

Closeout Actions Required:	Y/N	Date Submitted
Final Invoice or Copy of Final Invoice	Y	
Final Report of Inventions and/or Subcontracts	N	
Government Property Inventory & Related Certificate	N	
Classified Material Certificate	N	
Release and Assignment	N	
Other	N	

Subproject Under Main Project No.

Continues Project No.

Distribution Required:

Project Director	Y
Administrative Network Representative	Y
GTRI Accounting/Grants and Contracts	Y
Procurement/Supply Services	Y
Research Property Managment	Y
Research Security Services	N
Reports Coordinator (OCA)	Y
GTRC	N
Project File	Y
OCA/CSD	N
Other	N
	N

FINAL REPORT ON 1988 SME EDUCATION FOUNDATION GRANT

Research Initiation
by

CHARLES UMEAGUKWU
George W. Woodruff School of Mechanical Engineering
Atlanta, Georgia 30332

In 1988 Georgia Tech received an SME Grant for research initiation. The project that we are proposing is a feasibility study on the use of a new, significantly more efficient technique of noncontact laser generation of ultrasound for nondestructive real-time process control. The new technique uses an array of laser beams in place of a single beam. The array may be obtained either by splitting the original laser beam into components that propagate to the sample through an array of fibers of different lengths, or by continuously scanning the laser beam across the surface of the sample. The proposed research includes a basic study to evaluate performance, and develop an analytical model for the array, as well as a study of a specific application to on-line quality control of the depth of penetration and porosity of the weld pool.

The SME grant has made it possible for us to prepare three proposals and a preproposal. The preproposal was submitted to the NSF in January 1989 and resulted in a request for full proposal. Officials at Marshall Space Center at Huntsville, Alabama, also requested that the full proposal be sent to them. The proposal is now complete and is being processed here at Georgia Tech. Once this review is completed, copies of the proposal will be sent to NSF and NASA (Marshall Space Center).

A part of our proposal was included in a major proposal submitted to NSF in February 1989 to establish an Engineering Research Center (ERC). This larger proposal, which is still under review, was submitted jointly by Georgia Tech and Penn State to establish a center for Emerging Acoustical Technologies.

The equipment for this research was bought with the capital equipment grant from SME. The equipment, which has been assembled and is being tested, will be used for laser/fiber optic generation of sound for noncontact nondestructive evaluation (NDE) of materials and processes.

It is not conceivable that we could have done all the things mentioned above without the grant from SME. The funding is helping us to gain some visibility in the area of on-line control of welding processes using noncontact sensing techniques. We believe that the grant has set in motion a research program that will have a far-reaching effect on the development of noncontact NDE sensing techniques for on-line process control in both friendly and unfriendly environments.

FINAL REPORT
ON
1988 SME EDUCATION FOUNDATION
EQUIPMENT GRANT #588-1170

By

Charles Umeagukwu
George W. Woodruff School of Mechanical Engineering
Georgia Institute of Technology
Atlanta, Georgia 30332

October, 1989

FINAL REPORT ON
1988 SME EDUCATION FOUNDATION
EQUIPMENT GRANT #588-1170

In 1988 Georgia Tech received an SME equipment grant. The purpose of the grant was to upgrade the equipment in the Graduate/Undergraduate Microprocessor Laboratory in Mechanical Engineering. Part of this grant was to be used to further manufacturing research in the area of automated welding processes. Thus for all the equipment has been purchased and are being assembled and tested. Some are already being used.

This grant has made an impact in our microprocessor related classes. There are more diversities now in the experiments that the students can perform, than was the case before. The enrollment limit for the number of students who could register for microprocessor class per quarter has been increased.

The microprocessor application classes prepare students to design at chip level and to learn assembly language programming for measurement and control of mechanical systems. In these classes students gain hands-on experience interfacing sensors and actuators with microprocessors and microcomputers. A knowledge of microprocessor applications is an essential skill for an ME student who is interested in manufacturing and automation.

Some of the equipment are being used for a research to control the depth of weld penetration and porosity in real-time. A successful real-time control of the depth of penetration and porosity will not only enhance the structural integrity of the welded members, but will also reduce the price of those products that involve welding. Real-time control of the depth of penetration will make it easier to weld thin sheets of metals without having a lot of rejects, because it is very easy to burn holes through them. One of the major reasons why welding process is not fully automated is the inability of the automation process to control the depth of penetration and porosity. There is no doubt that a successful implementation of this technique will hasten the complete automation of the welding processes.

It is not conceivable that we could have done all the things mentioned above without the grant from SME. The funding is helping us to gain some visibility in the area of on-line control of welding processes using noncontact sensing techniques. We believe that the grant has set in motion a research program that will have a far-reaching effect on the development of noncontact NDE sensing techniques for on-line process control in both friendly and unfriendly environments.